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# Service Oriented Architectures

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**Sponsored by**
**SPAWARSYSCOM**
**FORCEnet Chief Engineer**


XML

Enterprise Services

OA

SAML

COI Services

UDDI

Web Services

WSDL

# Service Oriented Architecture

Core Services

NCES

JSR-168

WSRP

J2EE

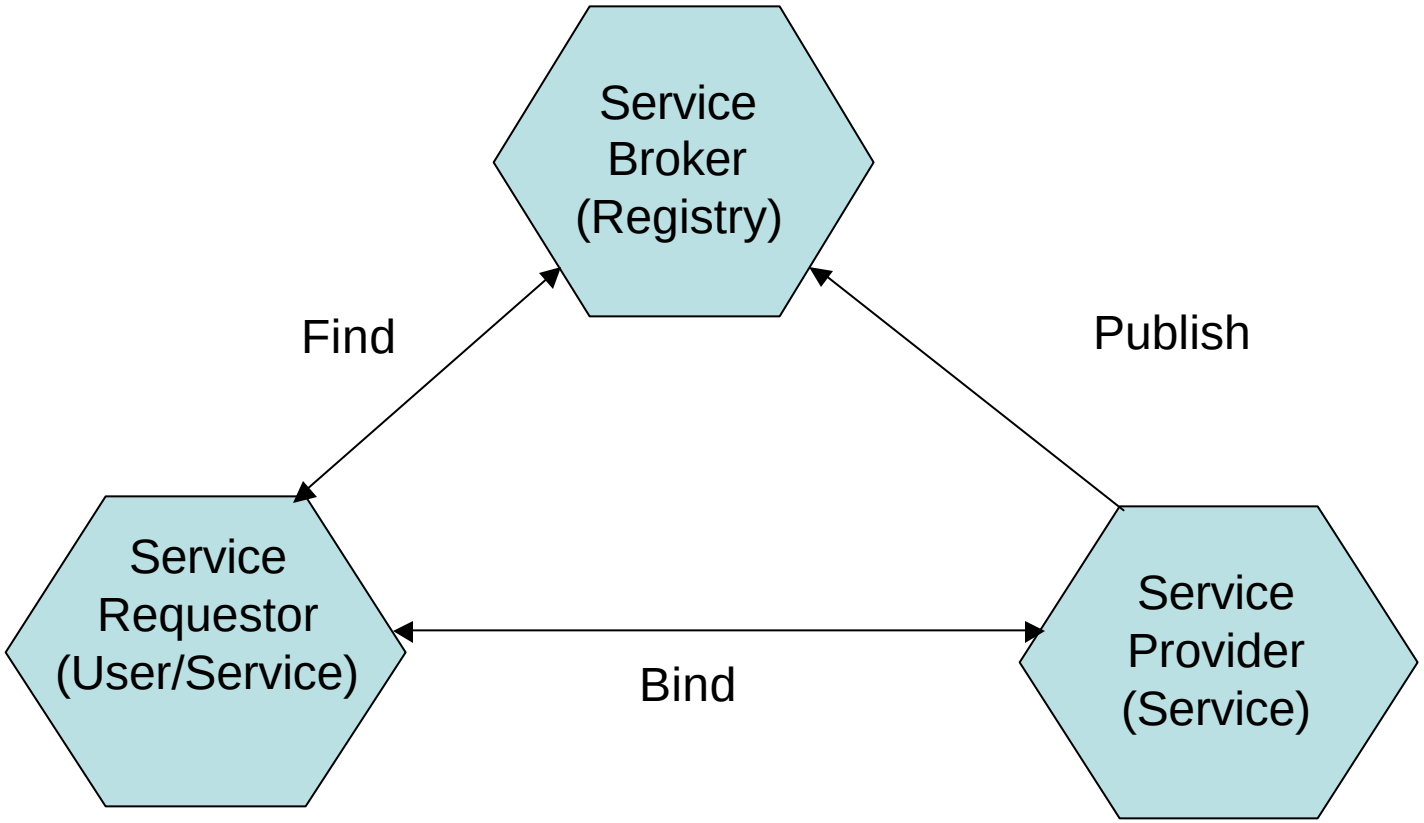
Distributed Services

.Net

GIG

SOAP

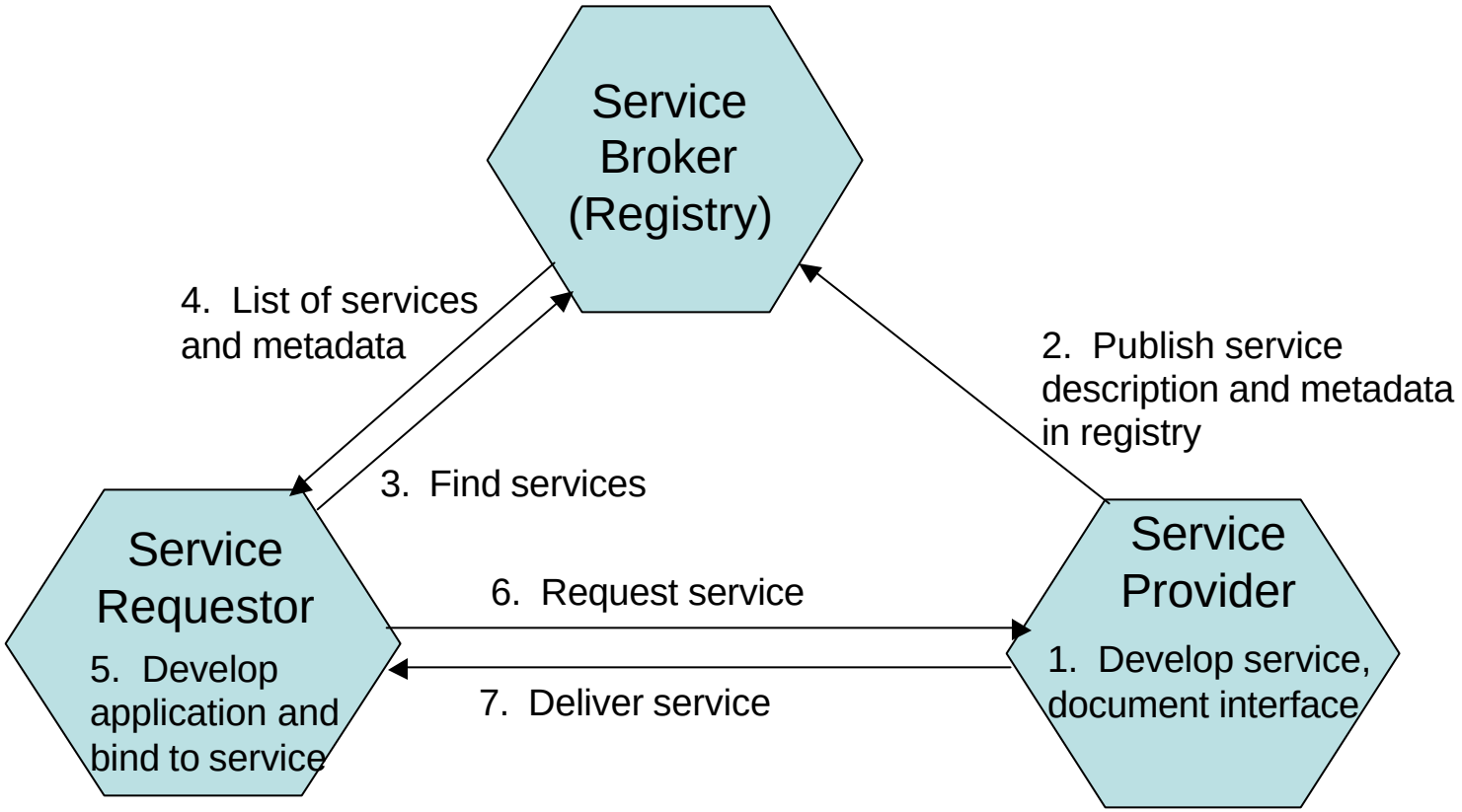
# Service-Oriented Architecture



# SOA Functional Components

- The SOA has four key functional components:
  - Service Implementation:
    - Build web service from scratch, provide a web service wrapper for legacy app, or create a new service interface for an existing web service.
    - Enterprise (all users/applications) or COI services
  - Publication:
    - Author the WSDL document, publish the WSDL on a Web Server, and publish the existence of your WSDL in a Web Services registry using a standard specification (UDDI).
  - Discovery:
    - Search the registry, get the URL, and download the WSDL file.
  - Invocation:
    - Author a client (SOAP) using the WSDL and make the request (SOAP message) and get the response (SOAP message).
- Other SOA functions include mediation (data translation) and service coordination (workflow)

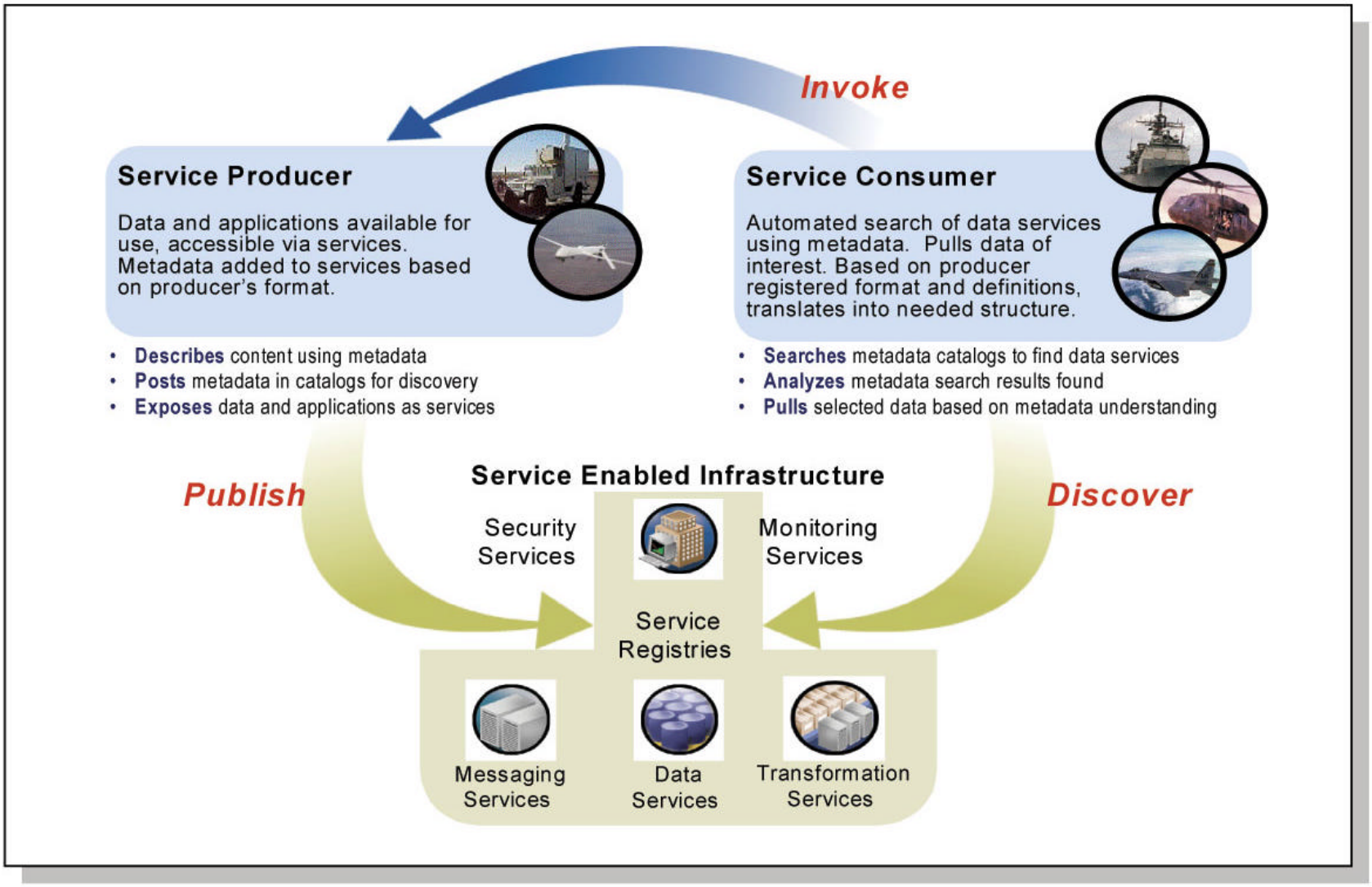
# SOA CONOPS


Service Broker (Registry)
4. List of services and metadata
2. Publish service description and metadata in registry
3. Find services
Service Requestor
6. Request service
Service Provider
5. Develop application and bind to service
7. Deliver service
1. Develop service, document interface

# SOA Technology Stack

- **XML – Extensible Markup Language**
  - The standard for data representation.
- **SOAP – Simple Object Access Protocol**
  - Enables enterprises to publish data, expose services, and invoke RPCs via XML and the Web. Supports multiple platforms and operating systems.
- **WSDL – Web Services Description Language**
  - A formal XML vocabulary and grammar that lets organizations describe, discover and use Web services in a UDDI registry or other location.
- **UDDI – Universal Description, Discovery and Integration**
  - UDDI gives enterprises a uniform way to describe their services, discover other services and understand the methods required to conduct business with a specific entity.
- Also – SAML, BPEL, WS-I, WS-Secure, WS-XX

# NCES SOA CONOPS



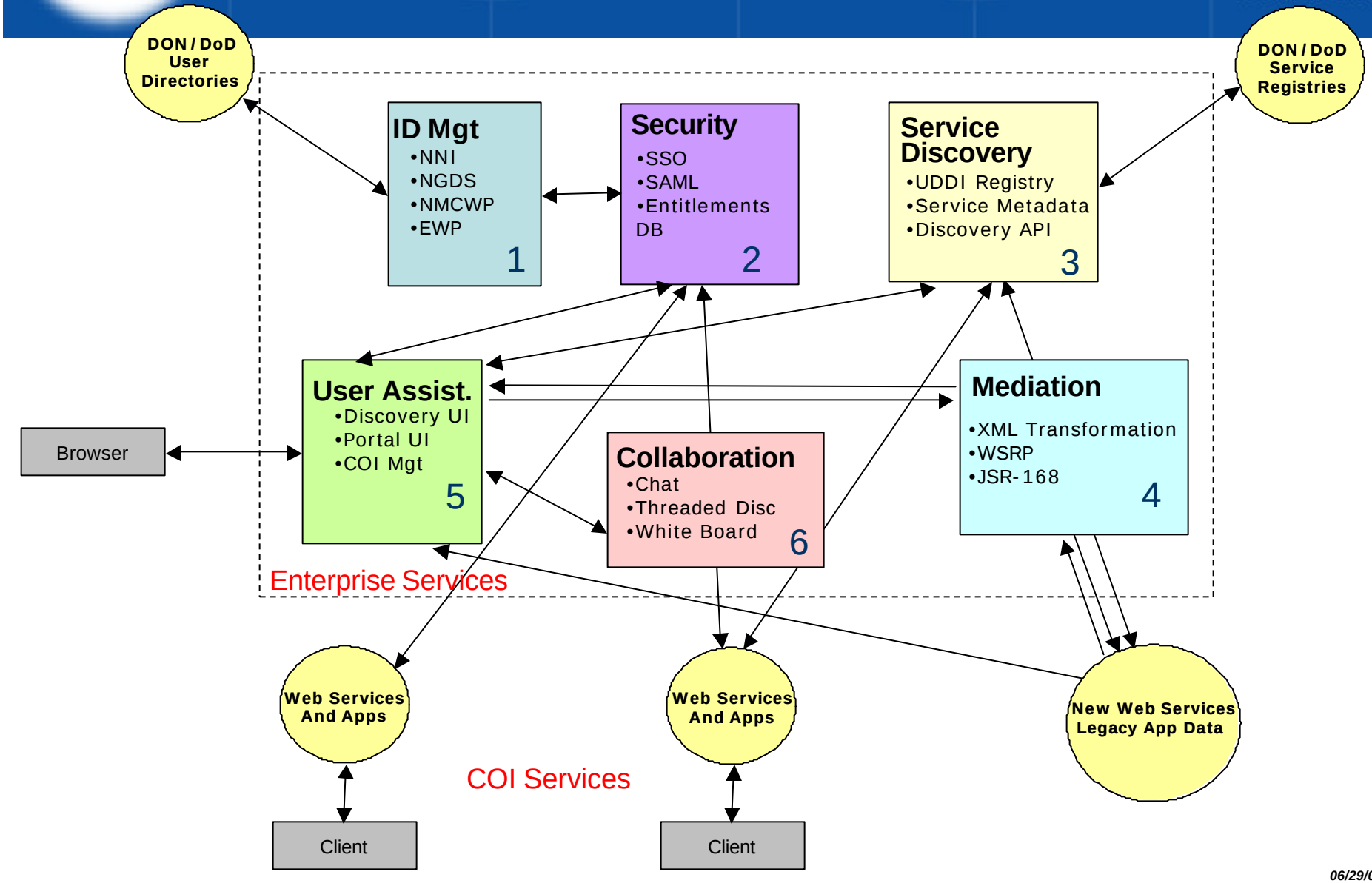
# Types of Services in SOA

- Enterprise services comprise the SOA infrastructure
  - Security:  for users and services
  - Identity management:  including user discovery and single sign-on
  - Registry: publish and subscribe to services
  - Mediation engine:  to transform/translate various data types
  - Orchestration engine:  to workflow services together
  - UI or portal:  to search and display
  - Collaboration:  to share information and tasking
  - Messaging: to transport requests, replies, data

# Types of Services in SOA

- COI services are data-driven services (data packets, business logic, content, information, etc.) published or subscribed by communities of interest (COI)
  - C2 COI service providers examples
    - GCCS-M
    - NTCSS
  - ISR COI service providers examples
    - $I^3$
    - METOC
  - MPTE
    - Integrated Learning Environment
    - BUPERS
  - Finance
    - MyPay
    - DTS
  - Etc.

# SOA Overview

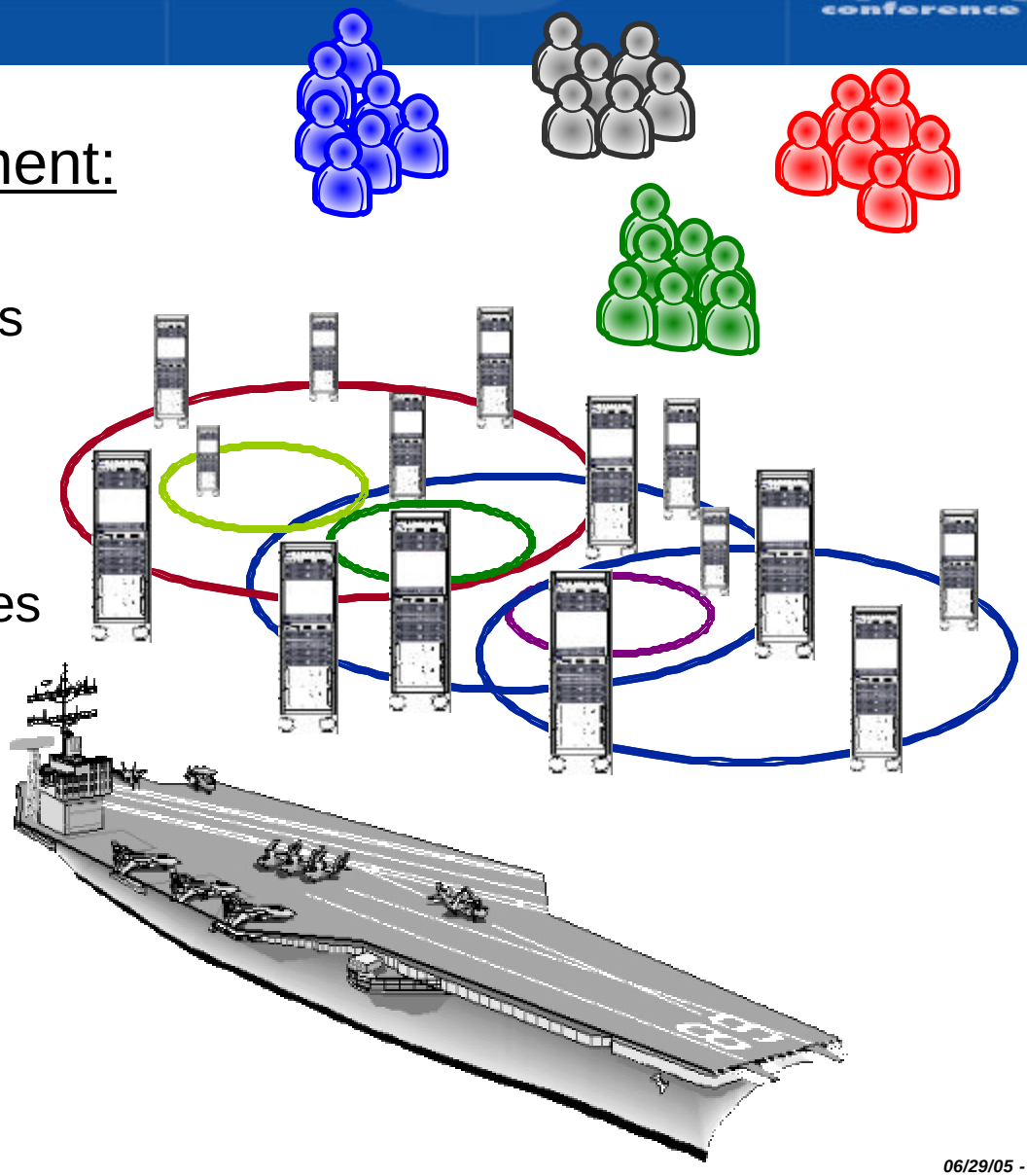


# Why a SOA?

## Afloat Operating Environment:

+ Multiple networks
+ Multiple stand-alone systems
+ Multiple communities

= Redundant, overlapping requirements and capabilities



# SOA Benefits

- The SOA approach has three key benefits:
  - It promotes flexibility and reuse. Developers use clearly defined, implementation-neutral interfaces rather than brittle APIs.
  - It isolates the specifics of data implementation from the service interface. Allows systems to evolve their internal implementation without impacting other systems.
  - Reduces IT costs. Software, hardware and point-to-point interface maintenance costs associated with stovepiped systems reduced/eliminated.
- Also supports:
  - Interoperability, elimination of redundant / overlapping systems, reduction of stovepiped systems, authoritative data sources, information sharing

# SOA Issues

- Security
  - Authorization through a chain of connected services will be hard
- Industry adoption of standards and protocols
  - Relatively immature and changing standards
- Network performance
  - XML transport needs to improve
- Support for dynamic data environments
  - Registries are suited for design-time changes not run-time changes
- Federation in disconnected operations
  - Requires built-in redundancies for scenarios where a service is not reachable

# Beyond SOA Basics

- Introducing New Services to The SOA
  - Application migration technical support
  - Service registration policies
  - FAM management and interaction
- Service Bus Management
  - Loosely coupled services vs integrated systems
  - Middle-layer dependencies and interoperability
- Enterprise Service Management
  - Visibility into the “health” of ALL services and ALL service dependencies
  - SLA management